EPA Awards

DESCRIPTIONS OF THE 1996
AWARD WINNING
CSO CONTROL PROGRAMS

FIRST PLACE: CITY OF BANGOR, MAINE

The City of Bangor, Maine is continuing to implement a CSO control program that was initiated in 1987. Bangor's efforts include implementing control measures that are consistent with the Nine Minimum Controls (NMCs) identified in the Policy and the completion in 1992 of a CSO Facilities Plan which constitutes Bangor's Long Term Control Plan (LTCP).

Bangor has identified two sensitive areas: The upper Penobscot River as a prime fishing are and the Kenduskeag Stream as a prime swimming area. Bangor's efforts have focused on the elimination of CSOs to these areas. Bangor has already eliminated 8 of its original 22 CSOs, and has reduced overflow occurrences at several others. Bangor's LTCP implementation efforts continue with an annual expenditure of $2 to $2.5 million in local funds. To date, the City has spent nearly $20 million.

Bangor's LTCP contains 23 projects, including several multi-year sewer separation projects. Implementation of the LTCP will run through 2009. Other projects include upgrading the treatment plant to handle 13 MGD of combined sewage, enlarging connector pipes to capture, more flow, and installing a combination conduit to combine several large drainage areas as well as CSO control technologies. Bangor's LTCP contains four phases. When the first two phases are complete, the City will evaluate the effectiveness of the program in meeting its objectives. The City will update its SWMM model using the latest version and incorporate any changes to its sewer system that have occurred as a result of completed projects.

Bangor's CSO Control Plan contains a number of innovative approaches/aspects including:
 Aerial mapping of the areas of the City where sewer control projects are planned. Used in conjunction with computer aided drafting and TV inspection videos, the aerial mapping has allowed the City to standardize its design methods, to generate sewer designs very efficiently, to produce well detailed construction drawings, and to standardize record drawings.

 Use of the floatable block technique to determine when an overflow event has taken place. A wooden block is placed on the weir of an overflow structure. After each rainfall, overflow structures are inspected. If the block is gone, an overflow event has occurred.
 All existing sewers crossing an Interstate highway were lined using the Isituform process to insure the longevity of those pipes. At the same time, several cross connection sewers, many under buildings, were lined using the same technique.
 Two projects were undertaken that put a sanitary sewer pipe inside a storm drain, creating double duty structures. Both projects were Interstate crossings approximately four hundred feet in length. By using an existing crossing/easement, the City avoided the high cost of drilling, boring or jacking the new sanitary pipe under the highway. One of the projects placed a concrete encased double wall insulated polyethylene sewer pipe on the floor of a 10’ by 14’ box culvert that carries a stream beneath the Interstate (see picture at right). The other placed an 8” polyethylene pipe on the invert of a 24” storm drain pipe, effectively separating a former combined sewer.
 One project was completed using 53” by 83” elliptical concrete pipe. The project was located in a narrow alleyway that contained an existing 42” sewer line. Site constraints prevented the addition of a second 42” pipe or the replacement of the existing pipe with a larger, 60” line. The elliptical pipe, which is vertically oriented, proved to be an innovative solution to what initially appeared to be an intractable problem.
 Two projects were designed to increase flow between overflow structures and sewer interceptors to reduce CSO discharges. The concept was to increase the pipe size carrying normal flow. Each project required a very expensive railroad crossing. With the use of a computer program written by one of the City’s Engineers, the projects were greatly simplified by modifying the overflow weirs such that the existing pipes were pressurized by additional head of water. Pressuring the existing pipes will allow them to carry the same flow as would the proposed larger sized pipe in a gravity situation. This avoided two very expensive railroad crossings.
 One of the control options being implemented is to provide primary treatment and disinfection concurrently in an existing primary settling tank isolated during wet weather for up to 13 MGD of CSO flows. This will require a “generic bypass” permit modification although the combined primary and secondary effluent will most likely meet the current permit limits.
 Future projects will include the possible use of hydrobrake-

type flow control devices, vortex separators, tank flushing devices, combing screens, and Supervisory Control and Data Acquisition (SCADA) systems.